WORKPIECE HOLDER FOR CLEAN CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a workpiece holder for clean container and, more particularly to such a workpiece holder, which is practical for use in a clean container to hold workpieces horizontally in position.

2. Description of Related Art

In semiconductor foundries, produced wafers are horizontally arranged in a cassette, which has supporting flanges for holding a number of wafers in horizontal. The cassette can be mounted on the base of a wafer container, for example, a POD or FOUP, and then covered by the housing of the wafer container for transfer. The housing protects wafers against contamination.

When carrying the wafers in the cassette inside the wafer container, wafers may displace during transfer of the wafer container. In order to eliminate this problem, a positioning structure is used in the wafer container. When covering the housing of the wafer container on the cassette on the base, a slide is against at the base of the wafer container, and then the base pushed the slide and to move a holder member forwards, causing the holder member to hold down loaded wafers. According to this design, a friction is produced between the slide and the base when the base pushing the slide, and such friction causes particles that may contaminate loaded wafers.

Except the aforesaid wafer container, some other clean containers

for carrying photo masks, glass substrates, and other workpieces may have the same problem.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a workpiece holder for clean container, which uses a linking mechanism to prevent the occurrence of friction and the production of particles when covering the housing of the clean container, keeping the workpieces well protected against contamination.

To achieve this and other objects of the present invention, the workpiece holder is used in a clean container, which comprises a base, a cassette, and a housing, wherein the cassette fixedly provided at the top side of the base and adapted to hold a number of workpieces that are transversely insertable into the cassette, the housing adapted to cover the base over the cassette.

The workpiece holder is comprised of a locating member, a vertical slide, a holder member, and a link. The locating member is fixedly fastened to the inside wall of the housing of the clean container, having a vertical sliding groove and horizontal knuckle means. The vertical slide is vertically movably inserted into the vertical sliding groove of the locating member, having a transversely horizontal sliding groove. The holder member is set between the locating member and the cassette, comprising a thrust face, a horizontal sliding block, and horizontal knuckle means, wherein the thrust face disposed at the front side of the holder member and

adapted to push the workpieces in the cassette into position, the horizontal sliding block backwardly extended from the back side of the holder member and movably inserted into the corresponding horizontal sliding groove of the vertical slide. The link has a first pivot, and a second pivot, wherein the first pivot pivoted with the horizontal knuckle means of the locating member, the second pivot pivoted with the horizontal knuckle means of the holder member.

When covering the housing on the base, a bottom side of the vertical slide is stopped at the top side of the base, and the locating member is continuously lowered with the housing, thereby causing the vertical slide to slide upwardly along the vertical sliding groove of the locating member, so as to turn the link upwardly subject to the first pivot, and at the same time the horizontal sliding block of the holder member slides forward in the horizontal sliding groove of the vertical slide, and the thrust face of the holder member pushes the inserted workpieces in the cassette into position.

When stopping the bottom side of the vertical slide against the top side of the base of the clean container, the vertical slide is contacted with the base in a specific point, the vertical slide does not displace relative to the base, therefore no friction is produced between the vertical slide and the base. Because no friction is produced between the vertical slide and the base, no particles are produced when covering the housing to set workpieces into position in the cassette, workpieces are well protected in the clean container against contamination.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an applied view showing a workpiece holder used in a clean container according to the present invention.

FIG. 2 is an exploded view of the workpiece holder used in the clean container shown in FIG. 1.

FIG. 3 is a schematic drawing showing the action of the workpiece holder according to the present invention (I).

FIG. 4 is a schematic drawing showing the action of the workpiece holder according to the present invention (II).

FIG. 5 is an exploded view of an alternate form of the workpiece holder according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a clean container (for example, a SMIF FOUP) **1** is shown comprising a base **12**, a cassette **121** fixedly provided at the top side of the base **12** and holding a plurality of wafers (workpieces) **13** that are transversely inserted into the cassette **121**, and a housing **11** covering the base **12** over the cassette **121**.

Referring to FIG. 2 and FIG. 1 again, the workpiece holder used in the aforesaid clean container **1** is comprised of a locating member **2**, a vertical slide **3**, a holder member **4**, and a link **5**. The locating member **2** is fixedly fastened to the inside wall **111** of the housing **11** of the clean

container **1**. According to this embodiment, the locating member **2** has two mounting holes **23** bilaterally disposed at the top side thereof and fastened to the inside wall **111** of the housing **11** of the clean container **1** with two screws **6** respectively. The locating member **2** having a vertical sliding groove **21**, and horizontal knuckles **22** horizontally disposed in front of the vertical sliding groove **21**, and first stop means, for example, two vertical stop flanges **211** symmetrically disposed at two lateral edges of the vertical sliding groove **21**, and second stop means, for example, a horizontal stop flange **212** disposed inside the vertical sliding groove **21** below the vertical stop flanges **211**.

The vertical slide **3** is vertically slidably inserted into the vertical sliding groove **21** of the locating member **2**, having a horizontal sliding groove **31** transversely disposed at the top side, a first stop flange **33** protruded from the front side near the top (horizontal sliding groove **31**) for downwardly stopping at the vertical stop flanges **211** of the locating member **2** to limit downward moving distance of the vertical slide 3 when sliding in the vertical sliding groove **21**, and to prevent falling of the vertical slide **3** out of the vertical sliding groove **21** of the locating member **2**, and a second stop flange **34** protruded from the back side near the bottom for upwardly stopping at the horizontal stop flange **212** to limit upward moving distance of the vertical slide **3** in the vertical sliding groove **21**.

The holder member **4** is a substantially U-shaped plate member set between the locating member **2** and the cassette **121**, having a thrust face

43 symmetrically bilaterally disposed at the front side corresponding to the wafers 13 in the cassette 121, a horizontal sliding block 41 perpendicularly extended from the back side and inserted into the corresponding horizontal sliding groove 31 of the vertical slide 3, and horizontal knuckles 42 horizontally aligned at the back side and spaced above the horizontal sliding block 41 at a pre-determined distance.

The link 5 comprises a first pivot 51 pivoted with the horizontal knuckles 22 of the locating member 2, and a second pivot 52 pivoted with the horizontal knuckles 42 of the holder member 4.

Referring to FIG. 4 and FIGS. 2 and 3 again, when covering the housing 11 on the base 12, the bottom side 32 of the vertical slide 3 is stopped at the top side of the base 12 at first (see FIG. 3), and then the vertical slide 3 is forced to slide upwardly along the vertical sliding groove 21 of the locating member 2 till the second stop flange 34 of the vertical slide 3 is stopped at the bottom side of the horizontal stop flange 212, and at the same time the link 5 is forced to turn upwardly about the axis of the first pivot 51, causing the horizontal sliding block 41 of the holder member 4 to slide forward along the horizontal sliding groove 31 of the vertical slide 3, and therefore the thrust faces 43 of the holder member 4 are forced to push the inserted wafers 13 in the cassette 121 into position.

When stopping the bottom side 32 of the vertical slide 3 against the top side of the base 12 of the clean container 1, the vertical slide 3 does not displace relative to the base 12, and both the vertical slide 3 and the base 12 are maintained in contact with each other at a specific point. By means

of the linking mechanism formed of the horizontal sliding groove **31** of the vertical slide **3**, the horizontal sliding block **41** of the holder member **4**, and the link **5**, the workpiece holder automatically pushes wafers **13** into position in the cassette **121**. Because no friction is produced between the vertical slide **3** and the base **12**, no particles are produced when covering the housing **11** to set wafers **13** into position in the cassette **121**, wafers **13** are well protected in the clean container **1** against contamination.

FIG. 5 is an exploded view of an alternate form of the present invention. This embodiment is substantially similar to the aforesaid first embodiment of the present invention with the exception of that the horizontal sliding block **71** and the horizontal knuckles **72** of the holder member **7** are disposed at the same elevation, i.e., the horizontal knuckles **72** are formed integral with the horizontal sliding block **71**. This embodiment achieves the same effect as provided by the aforesaid first embodiment of the present invention.

A prototype of workpiece holder for clean container has been constructed with the features of FIGS. 1~5. The workpiece holder for clean container functions smoothly to provide all of the features discussed earlier.

Although particular embodiments of the present invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.